

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-14 are presently pending in this application, Claims 1, 2 and 14 having been amended by the present amendment.

In the outstanding Office Action, Claims 2 and 14 were objected to for being improper; Claims 1-3, 6, 13 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ichikawa et al. (U.S. Patent 6,984,253) in view of Pitcher, Jr. (U.S. Patent 4,329,162); Claim 4 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ichikawa et al. in view of Pitcher, Jr. and further in view of Shimoda et al. (U.S. Patent 5,725,618); Claim 5 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ichikawa et al. in view of Pitcher, Jr. and further in view of Merry (U.S. Patent 5,171,341); Claim 7 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ichikawa et al. in view of Pitcher, Jr. and further in view of Shimoda et al.; Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ichikawa et al. in view of Pitcher, Jr. and further in view of Shimoda et al.; Claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ichikawa et al. in view of Pitcher, Jr. and further in view of Shimoda et al.; Claim 10 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ichikawa et al. in view of Pitcher, Jr. and further in view of Merry; Claim 11 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ichikawa et al. in view of Pitcher, Jr. and further in view of Merry; and Claim 12 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ichikawa et al. in view of Pitcher, Jr. and further in view of Merry.

In response to the objection to Claims 2 and 14, Claims 2 and 14 have been amended to recite that “the bending strength $F\alpha$ (MPa) and the length L (mm) satisfy the relationship of $30 \leq F\alpha \times L \leq 200$.”

Claim 1 has been amended herein. These amendments are believed to find support in the specification, claims and drawings as originally filed and no new matter is believed to be added thereby. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned who will be happy to work in a joint effort to derive mutually satisfactory claim language.

Before addressing the rejection based on the cited references, Claim 1 is directed to a honeycomb filter for purifying exhaust gases and recites “a columnar body comprising porous ceramic and having a plurality of through holes extending in parallel with one another in a length direction of the columnar body, the columnar body having a wall portion interposed between the through holes and configured to filter particulates in exhaust gases; and a plurality of plugs filling ones of the through holes at one end of the columnar body and filling ones of the through holes at the other end of the columnar body, wherein the columnar body has a three-point bending strength $F\alpha$ (MPa) measured in accordance with JISR1601, the plurality of plugs has a length L (mm) in the length direction, and the columnar body and the plurality of plugs are formed such that the three-point bending strength $F\alpha$ (MPa) and the length L (mm) are adjusted to satisfy the relationship of $F\alpha \times L \geq 30$.”

By providing the columnar body and plugs as such (*i.e.*, a columnar body with a lower three point-bending strength can be prevented from cracking by making plugs longer, and a columnar body with a higher three-point bending strength can be prevented from cracking simply by using shorter plugs), the wall portion of the columnar body is significantly prevented from cracking caused by, for example, the vibrations from an automobile, the impact during installation, and the impact of exhaust gas pressure. (See the attached Exhibit 1.)

The Office Action maintains that the subject matters recited in Claim 1 is unpatentable because “[i]t would have been obvious ... to modify the Ichikawa et al.

that Ichikawa et al. does not teach or suggest “a columnar body ...; and a plurality of plugs ..., wherein *the columnar body has a three-point bending strength $F\alpha$ (MPa) measured in accordance with JISR1601*, the plurality of plugs has a length L (mm) in the length direction, and *the columnar body and the plurality of plugs are formed such that the three-point bending strength $F\alpha$ (MPa) and the length L (mm) are adjusted to satisfy the relationship of $F\alpha \times L \geq 30$* ” as recited in amended Claim 1 (emphasis added in italic).

Specifically, Ichikawa et al. merely shows that honeycomb filters are constructed using filter segments A or B, where the segment A has the bending strength of 35 MPa and the segment B has the bending strength of 12 MPa. However, it is respectfully submitted that the bending strength described in Ichikawa et al. refers to a four-point bending strength, where a bending moment between two stress points is measured while keeping a shearing force between the two stress points zero.¹ This measurement allows to evaluate a strength against thermal stress slowly exerted and is consistent with the problem associated with thermal stress as addressed by Ichikawa et al.² On the contrary, the three-point bending strength recited in amended Claim 1 measures a bending moment at a single stress point, where at no points, a shearing force is zero and the bending moment is always affected by a shearing force. As such, unlike the four-point bending stress, the three-point bending stress allows to evaluate a strength against a shearing stress quickly exerted by vibrations and impacts. Therefore, the subject matter recited in Claim 1 is believed to be distinguishable from Ichikawa et al., and even assuming *arguendo* that the teachings of Ichikawa et al. and Pitcher, Jr. are combined, a resulting product would not meet the requirements of the subject matter recited in Claim 1.

¹ See, for example, Ichikawa et al., column 8, lines 66-67.

² See, for example, Ichikawa et al., column 1, lines 34-39.

As discussed in the previous response, Pitcher, Jr. simply states that “the cement plugs were generally made with a depth or length into the cell from an end face thereof in the range of about 9.5-13 mm” and does not teach or suggest the relationship between the bending strength of the honeycomb filter and the length of the plugs. Thus, the subject matter recited in Claim 1 is believed to be distinguishable from Pitcher, Jr.

Shimoda et al. and Merry are cited for “collected and accumulated fine particles being removed by a back washing process using a gas flow” and “collected and accumulated fine particles being removed by heating exhaust gases and allowing the heated gases to flow therein,” respectively, and they are not believed to teach or suggest “a columnar body ...; and a plurality of plugs ..., wherein *the columnar body has a three-point bending strength $F\alpha$ (MPa) measured in accordance with JISR1601*, the plurality of plugs has a length L (mm) in the length direction, and *the columnar body and the plurality of plugs are formed such that the three-point bending strength $F\alpha$ (MPa) and the length L (mm) are adjusted to satisfy the relationship of $F\alpha \times L \geq 30$* ” as recited in amended Claim 1 (emphasis added in italic). Thus, the subject matter recited in Claim 1 is believed to be distinguishable from Shimoda et al. and Merry.

Because none of Ichikawa et al., Pitcher, Jr., Shimoda et al. and Merry discloses the bending strength $F\alpha$ (MPa) and the length L (mm) adjusted to satisfy the cited relationship as recited in amended Claim 1, their teachings even combined are not believed to render the honeycomb filters recited in Claim 1 obvious.

For the foregoing reasons, Claim 1 is believed to be allowable. Furthermore, since Claims 2-14 depend directly or indirectly from Claim 1, substantially the same arguments set forth above also apply to these dependent claims. Hence, Claims 2-14 are believed to be allowable as well.

In view of the amendments and discussions presented above, Applicant respectfully submits that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

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